Nov. 4, 1952 R. L. GILL ET AL 2,616,557

VACUUM-ACTUATED ASH TRAY FOR VEHICLES

Filed Nov. 25, 1949 2 SHEETS—SHEET 1

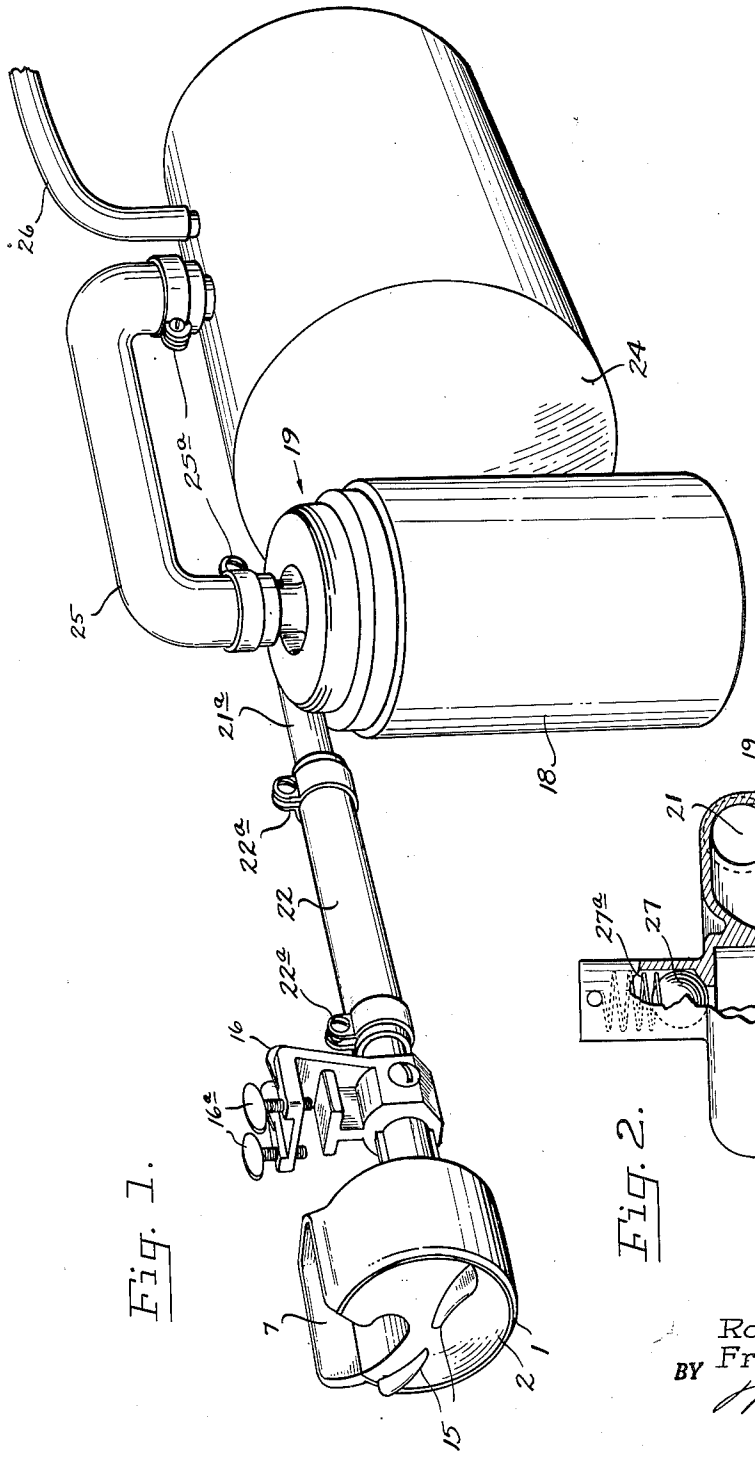

Fig. 1.

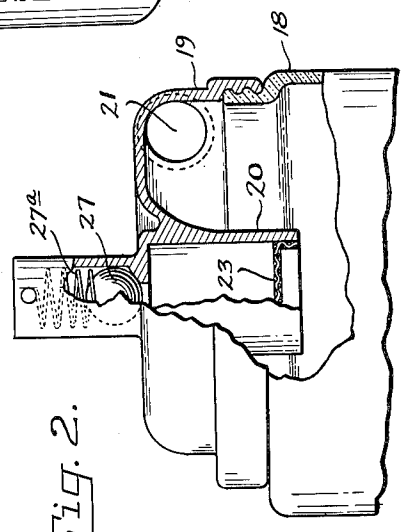

Fig. 2.

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Fig. 5.

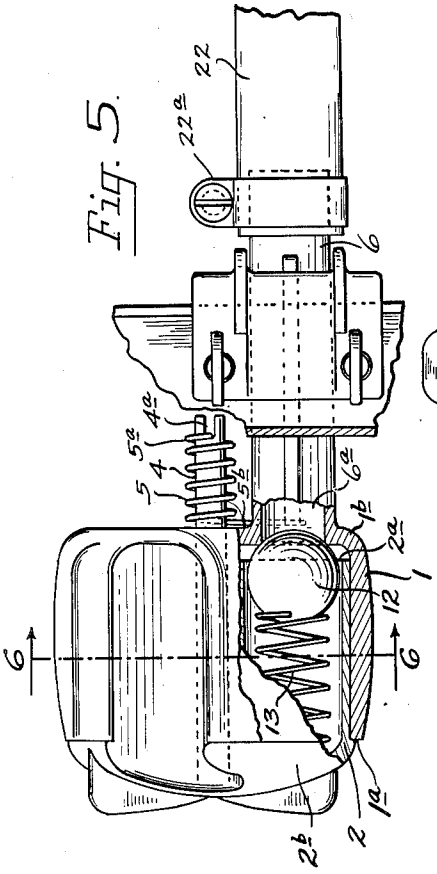


Fig. 4.

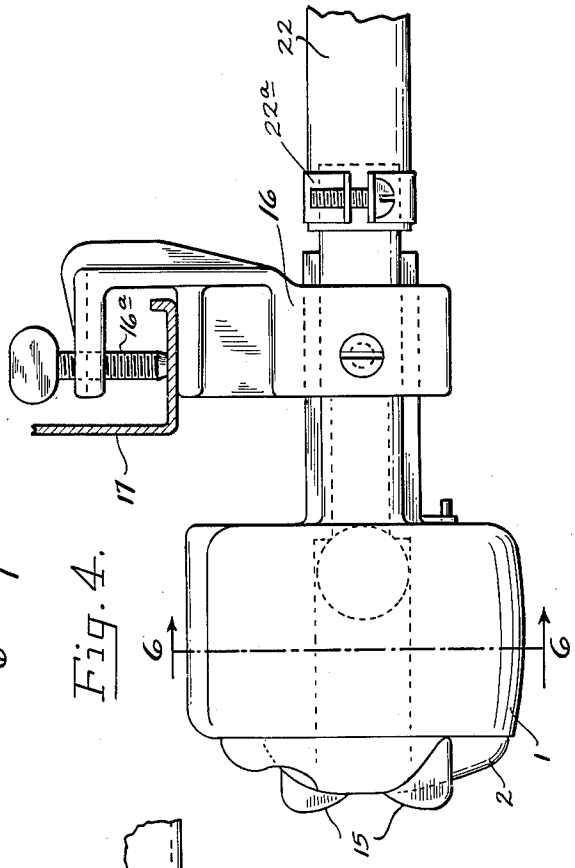


Fig. 6.

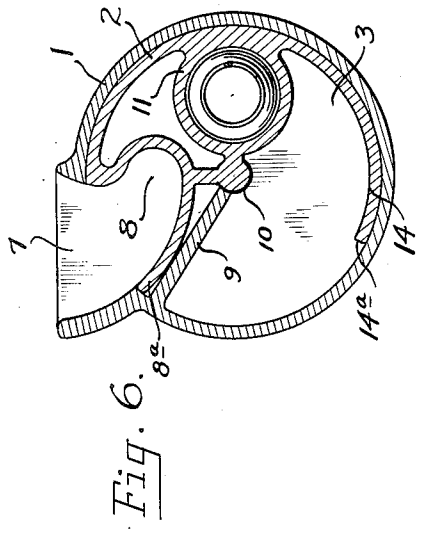
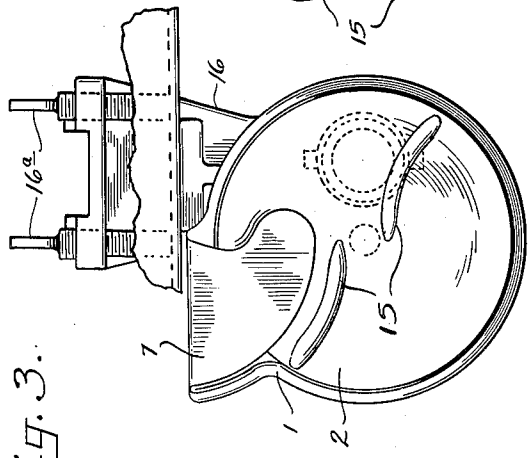


Fig. 3.



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VACUUM-ACTUATED ASH TRAY FOR VEHICLES

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10 Claims. (Cl. 206—19.5)

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Our invention relates generally to dumping-type ash trays, and specifically to ash trays for use in vehicles and particularly in automobiles. In connection with the latter use, it is a common occurrence to have ash trays filled with cigarette stubs and debris and, because of their limited capacity, they offer a problem of disposal. This is particularly true if an automobile is being driven along a highway and any of the cigarette butts are still burning. Other disagreeable factors involved in ash trays as presently constructed are that they frequently give off an offensive odor which permeates the interior of a vehicle. Also if a driver wishes to use them it is difficult to dump ashes or cigarettes therein without taking his eyes from the road. It is difficult to extinguish a lighted cigarette therein, and the closure devices therefor are seldom airtight to cut off the supply of oxygen to the interior and to extinguish the burning of partially extinguished cigarette butts.

One of the principal objects of our invention is to provide a handy ash tray which may be secured to the instrument panel of an automobile, which ash tray is of small compass but adequate to receive and hold a partially burned cigarette, and a refuse container which may be arranged some distance therefrom. Said refuse container is evacuated, that is maintained at subatmospheric pressures, and the ash tray is provided with a valve mechanism. Said valve mechanism can be actuated and the cigarette stub, ashes and other refuse will be drawn into the receiver and the burning thereof will be inhibited or quenched.

A further and more specific object of our invention is to provide an ash tray of this character which need only be partially actuated and the flow of air moving therethrough from an evacuated refuse container will cause it to move into fully discharged position to have the contents removed therefrom and will return to its initial or filling position by a spring.

A further and more specific object of our invention is to provide a refuse container in connection with said ash tray which will have sufficient capacity to maintain the operation of said associated devices without undue fluctuation, will separate the solids from the air, will collect the solids at the bottom thereof, and be joined to the intake manifold of an internal combustion engine, which will thus maintain subatmospheric pressures within said refuse container.

Further objects and features of our invention are hereinafter described with reference to the accompanying drawings, in which:

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Fig. 1 is a perspective view of an ash tray, a refuse container, and a container for maintaining a supply of air under subatmospheric pressures, said parts being connected by conduits;

Fig. 2 is a detail view with portions shown broken away, illustrating the details of said refuse collecting container;

Fig. 3 is a side elevation of an ash tray embodying our invention, with portions shown broken away to disclose details of the mounting therefor;

Fig. 4 is an elevation of said ash tray and its mounting and discharge conduit, illustrating the manner in which said ash tray may be mounted upon the bottom of an instrument panel of a vehicle, said panel being shown in section;

Fig. 5 is a similar view of the structures illustrated in Fig. 4, but shown rotated 90° and with portions of the housing shown broken away to disclose the ball-check valve for controlling the flow of air from the ash tray to the discharge conduit therefrom; and

Fig. 6 is a sectional view taken on the line 6—6 in both Figs. 4 and 5, but with the portions arranged as they are illustrated in Fig. 4, said section showing structural details of the rotatable receiver and the housing of said ash tray.

An ash tray embodying our invention comprises a bell-shaped housing 1, having one open side 1*a* and a cup-shaped receiver 2 having one open side 2*a*. The receiver is journaled in the housing and the open sides of said parts oppose each other so that they define within them a chamber 3. The receiver is carried upon an axial shaft 4 and is spring-loaded by a torque spring 5. One end of said spring 5*a* lies within the bifurcated end 4*a* of the shaft, and the other end 5*b* of said spring extends laterally from the shaft and engages the exterior of a conduit 6, through which ashes are discharged from said housing. Said conduit preferably forms an integral part of said housing and enters through the closed side 1*b* thereof. Said housing is provided with a funnel-shaped aperture 7 extending substantially its entire length, as is shown in Fig. 5, and serves as an aperture into which and through which ashes and cigarette butts may be inserted into said housing.

The receiver 2 is not a complete circle, as is shown in Fig. 6, but is provided with a wall extending over 180° of a circle; that is to say, it extends within the bore of the housing over halfway around it, and thus has good journal bearing therein. A pocket 8 is formed therein and this pocket is in registry with the funnel-shaped aper-

ture 7 when the parts are arranged in filling position. Said parts are resiliently held in registry by the action of the torque spring 5, holding one wall of said pocket against a radial wall 9 forming a part of the housing. Said radial wall extends to and has rubbing contact with a central hub 10 in said receiver and, with a cylindrical ball-receiving well 11, forms an effective partition substantially diametrically of the ash tray when the parts are arranged as is shown in Fig. 6. Said well carries a check valve 12 and encloses a valve spring 13.

Said check valve seats upon the bore 6*a* of the conduit 6 when the parts are arranged as is shown in Figs. 3 to 6, inclusive, when in filling position. When the receiver rotates into discharging position, the radial wall 9 serves as abutment for the end 14*a* of the skirt 14 and limits rotation due to said abutment. This brings the pocket 8 into communication with the bore of the conduit 6 so that the contents of said pocket may be discharged through said conduit, as will hereinafter be described. As it is shown most clearly in Figs. 3 and 5, said pocket is arranged uppermost in the ash tray and extends through the closed side 2*b* of the receiver 2. This permits the ash tray to accommodate a cigarette stub longer than the overall length of said ash tray; that is to say, as long as the major portion of a cigarette stub lies in said pocket so that it will not become overbalanced, it will be retained in said pocket. When the receiver rotates into discharge position, said cigarette stub will be moved endwise through the pocket and into the bore of the conduit. Finger grips 15 are provided on the exterior face of the closed side of the receiver so that said receiver may be turned manually without great difficulty to initiate the discharging thereof.

Said ash tray is preferably carried by a clamp 16, having a thumb screw 16*a* to engage the lower edge of an instrument panel 17 of an automobile. Preferably arranged within the engine compartment, that is beneath the hood of an automobile, is a refuse container 18 which may resemble a small jar, such, for example, as a pint jar. A cap 19 is screw-fitted thereon. Said cap is formed somewhat like a cyclone separator with an axial, pendent tube 20 defining the discharge from said container and having an encircling volute 21 as the intake for said container. Joining the conduit 6 with an intake tube 21*a* on said volute is a section of rubber hose 22, secured to said conduit 6 and said intake tube by the usual clamps 22*a*. The connection between the conduit and the refuse container is capable of many variations, but a rubber tube and clamps are simple and flexible. Air flowing into said refuse container carrying ashes and cigarette butts flows circumferentially within the walls of the container and drops to the bottom thereof. Air flowing therefrom through the pendent tube 20 thus is separated from the incoming air, but, in the abundance of caution, we preferably provide a screen 23 within the bore of said tube to prevent solids from flowing outwardly into a tank 24, in which a larger supply of air under subatmospheric pressures is maintained. If a refuse container of substantial volume is provided, it is not necessary to have the additional tank. It is common, however, to have said auxiliary tanks in connection with other evacuated apparatus in an automobile, and thus we illustrate this arrangement. Said tank is joined to the container by a section of hose 25 having

clamps 25*a*, and said tank is joined to the intake manifold of an engine (not shown) by tubing 26. To maintain proper subatmospheric pressures within the container 18, we preferably provide a check valve 27 at the upper end of the pendent tube 20, said check valve being seated by a coil spring 27*a*. This permits air to flow from the container to the tank, but inhibits reverse flow.

The operation of our improved ash tray is as follows:

Attention is directed to the fact that the pocket, when in filling position, presents a smooth internal surface as is shown in Fig. 6, and there is a relatively close fit between the end wall 8*a* of said pocket and the housing. Said end wall serves not only as a scoop for moving ashes and cigarette butts along through the ash tray, but also serves as an operating vane, against which atmospheric air reacts to rotate the receiver clockwise, as viewed in Fig. 6, when the check valve is unseated. When ashes and a cigarette butt, for example, are placed in the pocket passing through the funnel-shaped aperture 7, it is necessary only to rotate said receiver clockwise, as viewed in Figs. 3 and 6, a few degrees. This will cause the receiver to rotate and rock the check valve 12 off its seat over the bore of the conduit 6, and air at atmospheric pressure will press against the outer face of the pocket wall 8*a* and continue the rotation of said receiver until said pocket moves into registration with and communicates with the bore of the conduit. The continued flow of air will cause the ashes and cigarette butt to be discharged through the bore of said conduit and into the receiver. Air flows from the funnel-shaped aperture 7 about the periphery of the receiver and into the bore of said conduit 6*a*, because the parts are not provided with a tight fit between the peripheral surface of the receiver and the bore of the housing. The flow of air about the receiver and into the bore of the conduit is of sufficient strength to overcome the rotative effects of the torque spring 5. When the air pressures tend to come more or less into balance, that is when the subatmospheric pressures within the container are more or less dissipated, the spring will return the receiver to its original position and the ball-check valve 12 will seat and the interior of the refuse container will then be reduced in pressure, due to the action of the tank or the intake manifold of the engine.

In practice, this series of actions occurs rather quickly. The receiver is rotated 5° or 10° and the flow of air carries the receiver from that position to discharge position, and it is returned by the spring in the matter of only several seconds. It is not essential, therefore, for a driver to look down to grip the end of the receiver carefully. It is necessary only to initiate said rotation and the remainder is wholly automatic. Because the pocket lies parallel with the axis of rotation of the receiver, there is no force tending to throw a cigarette butt out of said receiver, even though it is slightly longer than the latter, and as soon as the flow of air from atmosphere to the bore of the conduit commences, said cigarette butt is quickly drawn into said bore and is disposed of in the refuse container 18.

We claim:

1. The combination of an ash tray and an evacuated refuse collecting container associated therewith, said ash tray comprising a housing, a discharge conduit communicating at one end with said housing and at the other end with said

container, a receiver journaled in said housing and with said housing defining an enclosed chamber, an aperture leading through the wall of said housing, a pocket formed in the peripheral wall of said receiver, said aperture and said pocket registering when said ash tray is arranged in filling position, said pocket communicating with said conduit when said ash tray is in discharging position, a check valve carried by said receiver, which check valve seals the end of said conduit when said ash tray is in filling position, external means for unseating said check valve and initiating the rotation of said receiver, within said housing, from filling position towards discharging position, and one wall of said pocket defining a radially disposed vane in said receiver to continue the rotation of said receiver into discharging position when air flows through said conduit towards said evacuated refuse collecting container.

2. The combination of an ash tray and an evacuated refuse collecting container associated therewith, said ash tray comprising a housing, a discharge conduit communicating at one end with said housing and at the other end with said container, a receiver journaled in said housing and with said housing defining an enclosed chamber, an aperture leading through the wall of said housing, a pocket formed in the peripheral wall of said receiver, said aperture and said pocket registering when said ash tray is arranged in filling position, said pocket communicating with said conduit when said ash tray is in discharging position, a check valve carried by said receiver, which check valve seals the end of said conduit when said ash tray is in filling position, external means for unseating said check valve and initiating the rotation of said receiver, within said housing, from filling position towards discharging position, and means responsive to the unseating of said check valve for continuing the rotation of said receiver into discharging position when air flows through said conduit towards said evacuated refuse collecting container, and a spring means biasing said receiver toward said filling position.

3. A combination of an ash tray and an evacuated refuse collecting container associated therewith, said ash tray comprising a bell-shaped housing, a discharge conduit communicating at one end with said housing and at the other end with said container, a cup-shaped receiver journaled in said housing and with said housing defining an enclosed chamber, a funnel-shaped aperture leading through the wall of said housing, a pocket formed in the peripheral wall of said receiver, said aperture and said pocket registering when said ash tray is arranged in filling position, said pocket communicating with said conduit when said ash tray is in discharging position, a check valve carried by said receiver, which check valve seals the end of said conduit when said ash tray is in filling position, external means for unseating said check valve and initiating the rotation of said receiver, within said housing, from filling position towards discharging position, one wall of said pocket defining a radially disposed vane in said receiver to continue the rotation of said receiver into discharging position when air flows through said conduit towards said evacuated refuse collecting container, and a spring for returning said receiver to its filling position.

4. The combination of a dump-type ash tray with a movable member and an evacuated refuse collecting container associated therewith, said ash tray and refuse container being joined by a conduit, said member being movable into two positions, one where it can be filled from the exterior of said ash tray and another where it can discharge its contents into said conduit, a check valve arranged to seal said conduit, said member in moving from the first mentioned position towards said second mentioned position unseating said check valve, and means responsive to the unseating of said check valve for moving said member into the second mentioned position and discharging the contents of said member, through said conduit, into the receiver.

5. The combination of a dumping-type ash tray with a movable member and an evacuated refuse collecting container associated therewith, said ash tray and refuse container being joined by a conduit, said member being movable into two positions, one where it can be filled from the exterior of said ash tray and another where it can discharge its contents into said conduit, and a check valve arranged to seal said conduit, said member in moving from the first mentioned position towards said second mentioned position unseating said check valve, means responsive to the unseating of said check valve for moving said member into the second mentioned position and discharging the contents of said member, through said conduit, into the receiver, and elastic means for returning said member to its first mentioned position.

6. An ash tray, comprising an ash receiver member biased to a filling position in communication with a filling aperture and mounted for movement to a discharge position in communication with a discharge aperture, means for reducing the air pressure within said discharge aperture, and means rendered effective by a movement of said ash receiver member toward said discharge position and responsive to the reduced air pressure in said discharge aperture for continuing the movement in opposition to said bias.

7. An ash tray, comprising a rotatable ash receiver member biased to a filling position in communication with a filling aperture and rotatable to a discharge position in communication with a discharge aperture, means for reducing the air pressure within said discharge aperture, and means conditioned by an initial slight rotation of said ash receiver member for continuing said rotation in opposition to the bias, said latter means including a vane responsive to the reduced air pressure in said discharge aperture.

8. An ash tray, comprising an ash receiving member mounted for movement from a filling position in communication with a filling aperture to a discharge position in communication with a discharge aperture, check valve means normally sealing said discharge aperture and responsive to the movement of said ash receiving member for opening the discharge aperture to a reduced air pressure, and means for moving said ash receiver member to said discharge position in response to the opening of said discharge aperture.

9. An ash tray, comprising an ash receiving member mounted for rotation from a filling position in communication with a filling aperture to a discharge position in communication with a discharge aperture, means responsive to the rotation of said ash receiving member for opening the discharge aperture to an area of reduced air pressure, and means sequentially responsive to the opening of said discharge aperture for rotating said ash receiver member to said discharge posi-

tion and returning said ash receiver to said filling position.

10. An ash tray, comprising a rotatably mounted ash receiver member spring biased to a filling position in communication with a filling aperture and rotatably movable to a discharge position in communication with a discharge aperture, valve means spring biased toward sealing relationship with said discharge aperture and responsive to an initial rotation of said ash receiver member against said spring bias from said filling position toward said discharge position to unseat said valve means and open said discharge aperture, and vane means effective only when said valve means is unseated and said discharge aperture is open to continue rotation of said ash receiver member toward said discharge position in opposition to said spring bias.

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